

## Chapter 2

### Raw water arrangement and treatment

Water demand for residents of Delhi is projected to rise significantly from 1260 million gallons per day (MGD) to 1680 MGD by 2041. Despite sourcing water from rivers such as Yamuna, Ravi-Beas, and Ganga, DJB struggles to meet this escalating demand. Delayed approvals for critical projects like the Renukaji and Kishau dams aggravated the scarcity issues. Efforts to secure an extra supply from Himachal Pradesh have not fructified. DJB also failed to calibrate flow meters and install the required number of flow meters at different primary and secondary UGRs and to ensure that all the installed flow meters were functioning. DJB's failure to implement NEERI recommendations, apart from a shortage of DJB testing labs compromises water safety. The neglect in cleaning of reservoirs and underground storage tanks and challenges and rejuvenation of water bodies in Delhi further highlight systemic shortcomings.

#### 2.1 Introduction

CPHEEO norms (May 1999) and the Perspective Infrastructure Plan, 2041 of Delhi Jal Board (DJB) assessed that Delhi requires 1260 Million gallons per day (MGD) of water based on a norm of 60 gallons per capita per day (GPCD) by March 2022 and 1680 MGD by March 2041, for the city's projected population of approximately 21 million and 28 million respectively.

As of March 2022, nine Water Treatment Plants (WTPs) produced 845 MGD of potable water with an additional 90 MGD being extracted and directly supplied by DJB. Thus, 935 MGD of potable water was supplied to the residents of Delhi against the requirement of 1260 MGD. Availability of water to the residents of Delhi was only 45 GPCD at the production level, instead of the norm of 60 GPCD.

#### 2.2 Shortfalls in the Governance Structure for Water Management

##### 2.2.1 Water Policy for Delhi not framed

Section 16.2 of the National Water Policy 2012 recommends to all States that State Water Policies may need to be drafted/revised in accordance with this policy, keeping in mind the basic concerns and principles, as well as a unified national perspective.

Audit noticed that the Delhi Jal Board initiated the task of formulating a Water Policy for Delhi in 2011 with the objective of ensuring water security for Delhi in the face of an uncertain resource scenario. The draft document was deliberated in four workshops in which non-governmental experts, NGOs, and RWAs participated. However, the policy has not been formally notified, and no efforts

have been made by DJB to formulate the Water Policy as recommended in the National Water Policy.

DJB in its reply (11 July 2022) stated that it has prepared a long-term Perspective Plan MPD 2041, keeping in view the spirit of the policy document 2016.

Audit is of the view that the Perspective Plan cannot be a substitute for Water Policy. A policy is a long-term broad-based document setting out priorities and a strategic vision, whereas a Perspective Plan details the actions and processes to achieve the long-term vision of the organization.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

***Recommendation 1: Government should prepare a Water Policy for Delhi for effective planning and management of the water needs of Delhi, including emergencies by DJB.***

### **2.2.2 Absence of a Water Consultative Council**

As per Section 8 of DJB Act, 1998, the Government may constitute a Water Consultative Council to advise the Board on policy matters and for formulation of annual and five years plans; to give expert advice on administrative, financial and technical matters; to advise the Board on matter pertaining to the interest of consumers and issues affecting the environment; and to advise the Board on any matter on which the Board seeks its advice. Audit, however, noted that no such Water Consultative Council was constituted by the Government.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

### **2.2.3 Water Audit**

As per Para 2.6.5 of CPHEEO, Water Audit is required to be conducted to measure gaps in water produced and distributed. Water audit thus provides a fairly accurate picture of water production, water assessed and losses, both physical and revenue.

Audit noticed that DJB had not framed any guidelines or prescribed any procedure for periodically conducting Water Audit. It had conducted a Water Audit of the WTPs only once during the period under review in 2020-21 and it had indicated an overall water loss at WTPs at around 5.87 *per cent*. The maximum water loss was found at WTP Chandrawal (10.50 *per cent*) and minimum at WTP Dwarka (0.27 *per cent*). Five WTPs had water loss above five *per cent*.

However, DJB had not issued any directives or action plan for WTPs to minimize water loss during treatment to enhance water conservation, improve financial performance etc., thereby defeating the purpose of the Water Audit.

Thus, at the policy level the DJB had been found wanting in formulation a Water

Policy, setting up a Consultative Council and conducting of regular Water Audits to help enhance its efficiency.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

### 2.3 Water requirement, raw water availability and its augmentation

Delhi Jal Board receives raw/surface water from Himachal Pradesh, Haryana, Uttar Pradesh and Uttarakhand. Raw water for Delhi is drawn from River Ganga Upper Ganga Canal (UGC), River Yamuna, and Delhi Sub Branch (DSB)/Carrier Line Channel (CLC) of the Bhakhra Beas Management Board.

(i) The overall receipt of raw water from different sources during 2021-22 is given in **Table 2.1**.

**Table 2.1: Average raw water receipt per day during 2021-22**

(In MGD)					
State of origin	Source	Originated from	Release water quantity from origin	Mode	Water received at WTP after transmission loss
Haryana	Yamuna Water	Tajewala/ Hathni kund	484	Through Yamuna river	242
		Tajewala/ Hathni kund Munak regulator)	178	DSB	148
Punjab	Ravi-Beas Water	Nangal Dam (Munak regulator)	267	CLC	220
Uttar Pradesh	Ganga Water	Murad Nagar regulator	253	UGC	253
<b>Total</b>			<b>1182</b>		<b>863</b>

Source: Information provided by DJB

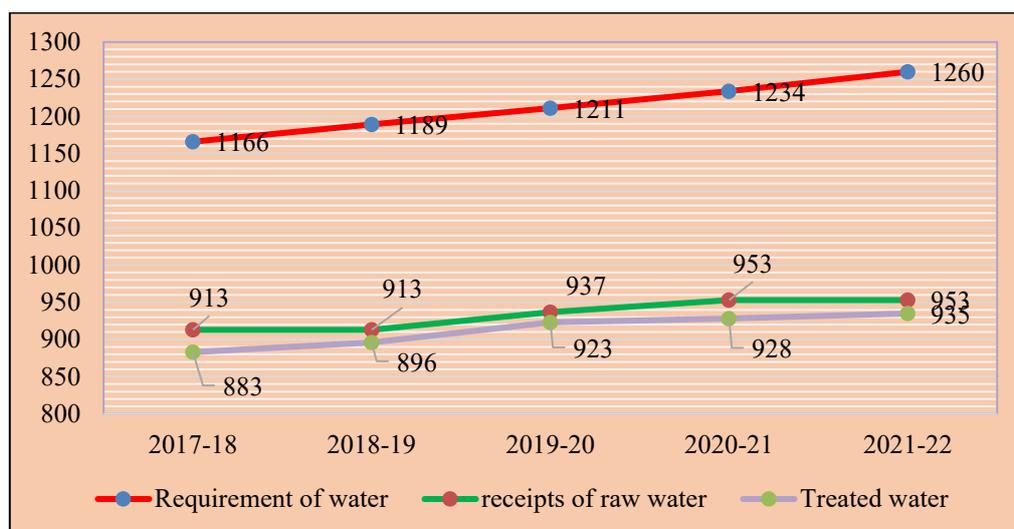
As can be seen from the table above, the water being received from Haryana suffers a 50 *per cent* transmission loss whilst flowing through the Yamuna River.

DJB had also extracted 90 MGD raw water from 11 Ranney wells and 4,919 tube wells during 2021-22. The trends in the projected requirement, actual production and shortfall in supply of water during 2017-18 to 2021-22 are shown in **Chart 2.1**.

#### 2.3.1 Inadequacy of raw water supply

As is clear from the preceding paras, the raw water supply to Delhi is below par. Details are in Chart below.

**Chart 2.1: Water Requirement, Receipts and Supply**



Source: Information provided by DJB and Economic Survey 2017-18 to 2021-22

It can be seen from **Chart 2.1** that due to increasing urbanization and population growth in Delhi, the requirement for potable water increased<sup>1</sup> significantly from 1166 MGD in 2017-18 to 1260 MGD in 2021-22, registering a growth of eight *per cent*, whereas the production capacity of potable water in Delhi had increased less than six *per cent* from 883 MGD (2017-18) to only 935 MGD (2021-22). This increased the demand-treatment gap from 283 MGD (2017-18) to 325 MGD (2021-22).

DJB has not been able to keep pace with the rapid urbanization of the city and has failed to match the supply with the demand, as assessed. The shortage in availability of raw water against the assessed requirement increased from 22 *per cent* (2017-18) to 24 *per cent* (2021-22) whereas the shortage in potable water against the assessed requirement increased from 24.2 *per cent* (2017-18) to 25.79 *per cent* (2021-22).

Persistent shortfalls in the availability of potable water led to a significantly reduced supply of water to the residents of the National Capital at an average rate of 45 GPCD against the norm of 60 GPCD.

- (i) The main reason for the gap between demand and supply of water was the inadequacy of water sources and the failure to augment/develop available water sources. Allotment of water to Delhi as per the Yamuna Water Sharing Agreement signed in May, 1994<sup>2</sup> every year is as detailed in **Table 2.2**.

<sup>1</sup> As per population projection for states during 2011 to 2036 published by National Commission on population, M/o Health and Family Welfare (July 2020).

<sup>2</sup> MoU between Northern Region States of Himachal Pradesh, Haryana, Uttar Pradesh, Punjab, Rajasthan and Delhi.

**Table 2.2: Allocation of Yamuna water to Delhi**

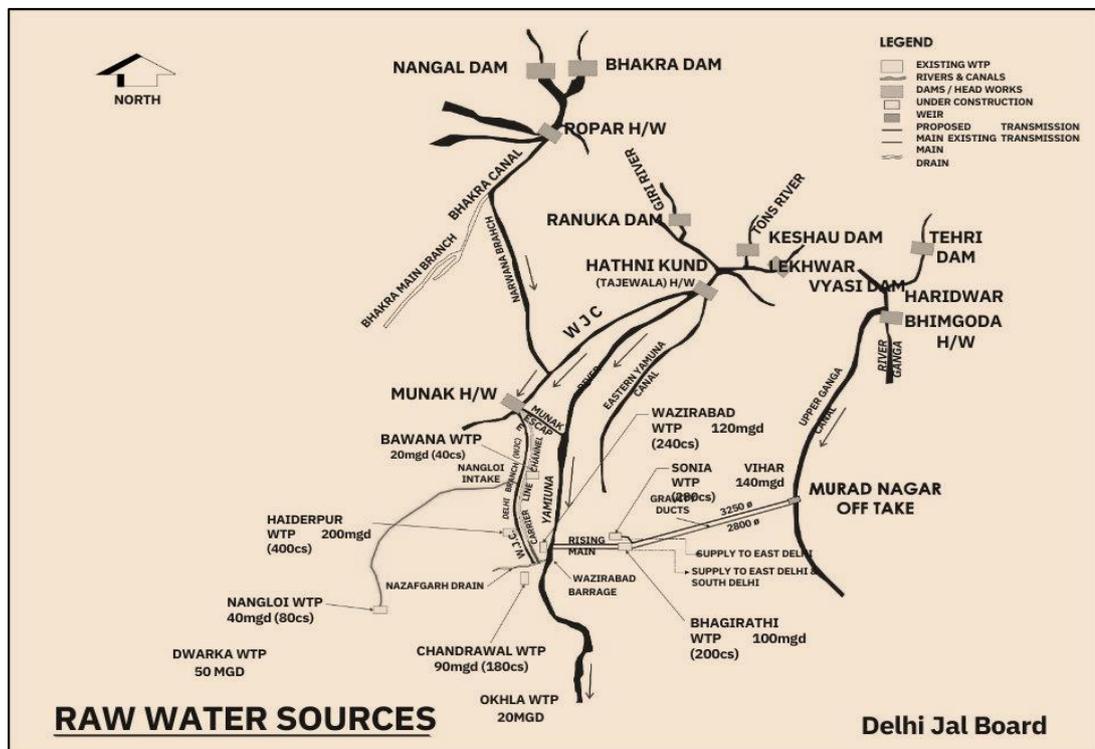
Sl. No.	Period	Allocation (in MGD)
1	July to October (monsoon season)	1544
2	November to February	150
3	March to June	167
	<b>Total</b>	<b>1861</b>

Source: Yamuna water sharing agreement

As can be seen from **Table 2.2**, 80 *per cent* of the allocation is during monsoon season, when most of the water flows through Delhi untapped. The allocation during the remaining two seasons works out to approximately 20 *per cent*.

- (ii) In order to utilize the flow of the river during monsoon, an MoU was signed (November 1994) by the basin States<sup>3</sup> to build two dams on Yamuna River, one at Renukaji (275 MGD) in Himachal Pradesh and another at Kishau (372 MGD) in Uttarakhand as shown in **Chart 2.2**. DJB made payment of ₹ 230.73 crore for construction of Renukaji dam (₹ 214.84 crore), Kishau dam (₹ 8.10 crore) and another dam at Lakhwar (₹ 7.79 crore) to HP and Uttarakhand (UK) Governments (March 2022). These projects were declared as projects of national importance. However, work on Renuka dam, Lakhwar and Kishau dams was under planning and approval stage with the Upper Yamuna River Commission (UYRC).

**Chart 2.2: Raw water sources and under construction Dams**



<sup>3</sup> Himachal Pradesh, NCT of Delhi, Haryana, Uttar Pradesh and Rajasthan.

Thus, work on these dams has not started even after a lapse of nearly 30 years since signing of the MOU due to pending approval from UYRC and NGT. The possibility of augmentation of raw water availability from Yamuna River in the near future is thus remote.

- (iii) Further, an agreement was signed between GNCTD/DJB and Government of Himachal Pradesh (GoHP) in December 2019 for regular supply of 368 cusecs<sup>4</sup> (237 MGD) from November to February and 268 cusec (173 MGD) from March to June every year. For this, GNCTD/DJB is required to pay to GoHP an advance amount of ₹ 4 crore every year. Audit however observed that the agreement has not been implemented (June 2023) despite repeated request by Delhi Jal Board to GoHP for implementation of MoU. Engineer-in-Chief, Jal Shakti Vibhag Shimla, Himachal Pradesh vide letters dated December 2020 (UYRC) and August 2021 (Member (WS), DJB) conveyed that there is no surplus water available with Himachal Pradesh during the period November to June.
- (iv) Additionally, based on available data, the Delhi Jal Board presently utilizes the entire quantity of raw water received daily and does not have a water reserve for even a single day's consumption. This is not an ideal situation as any disruption of daily supply has the potential to throw the water supply to Delhi out of gear.

During the Exit Conference (December 2023), DJB stated that the demand of 60 GPCD of water, based on CPHEEO norms, is considered on the higher side and needs to be rationalized. It was further added that the quantity of groundwater is more than what is reflected in the data, as most of the water extraction from borewells has not been accounted for yet. It further stated that once the assessment is complete and the per capita availability is rationalized, the demand-supply gap of water availability will reduce significantly. On the issue of untapped water, it was stated that DJB was getting more share of water than agreed upon during the lean (other than monsoon) period, and efforts were being made for the utilization of untapped water during monsoon.

While the inaccurate accounting of water extracted from borewells is evidenced in the audit finding (para 2.4.1.3), the other responses of DJB during the Exit Conference were contradictory to the data given by DJB, its Perspective Plan, and the norms on record. Further, as no documentation was provided in support of the assertions, they are unacceptable in audit.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

---

<sup>4</sup> Cubic feet per second.

**Recommendation 2: Government should put in place a system to obtain accurate data by DJB on the water extracted through borewells.**

### 2.3.2 Earmarked water level not maintained

For the smooth functioning of the WTPs at Wazirabad and Chandrawal, the water level at Wazirabad pond is required to be maintained at 674.5 feet by the Haryana Government by releasing extra water from Tajewala/ Hathini Kund. During 2017-22, Audit noted that the earmarked water level was not maintained on 494 days (27 per cent days) at Wazirabad pond, as a result, Chandrawal and Wazirabad WTPs did not operate to their full capacity. Necessary steps need to be taken by the DJB/GNCTD with the Haryana government to maintain the water level at Wazirabad.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).



Photo 2.1: Picture of water level at Wazirabad Pond Photo 2.2: Wazirabad pond during summer 2022

**Recommendation 3: Government need to explore ways for augmenting raw water sources to cater to the needs of a growing population.**

### 2.4 Unreliable water data

Water data is collected through either flow meters (instruments that measure the quantity of water that flows through pipelines) or based on the rate of pumping. If calibrated properly, the Flow meter data is considered more accurate as pumps generally do not function technically at 100 per cent efficiency.

#### 2.4.1 Absence of flow meters to measure quantity of water supplied

Flow meters are required to be installed at Under Ground Reservoirs (UGRs), Booster Pumping Stations (BPSs) etc. for quantification of water inflow or outflow, losses or leakages. Deficiencies observed regarding the installation and functioning of the flow meters are discussed in the succeeding paragraphs.

##### 2.4.1.1 Flow meters at Primary and Secondary UGRs/BPS

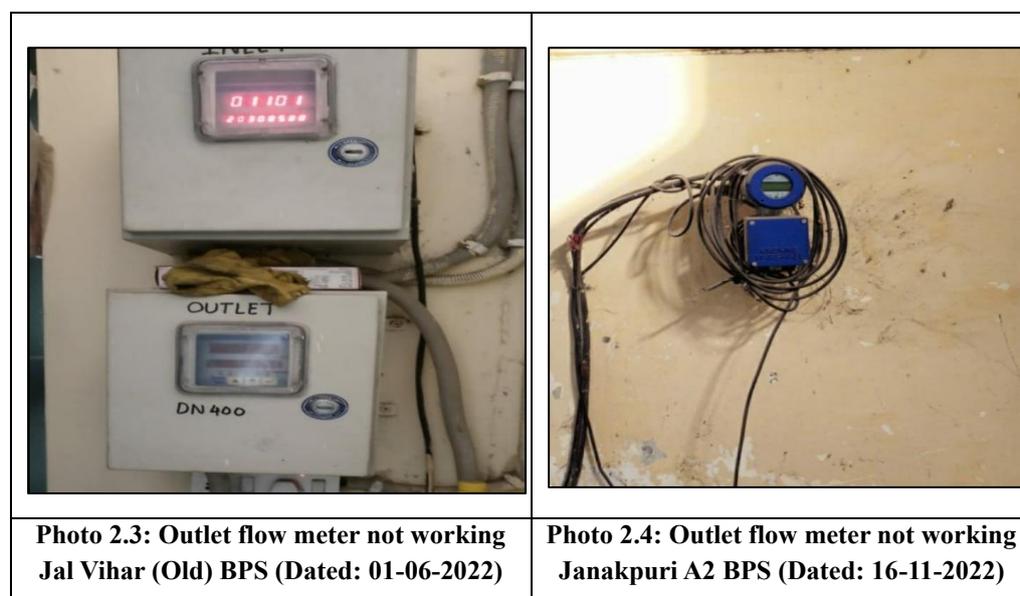
Potable water treated at WTP is supplied to the UGRs, which are generally

referred as ‘Primary UGRs’ (Pr. UGRs). The status of installation and functioning of flow meters at primary UGRs is given in **Table<sup>5</sup> 2.3**.

**Table 2.3: Status of installation, functioning of flow meters in Primary and Secondary UGRs**

UGRs	Total No. of flow meters to be installed in Pr. UGRs (inlets + outlets)	Flow meters installed in Pr. UGRs		Flow meters functional in Pr. UGRs	
		Number	Percentage (out of required)	Number	Percentage (out of installed)
Primary UGRs	295	194	65.8	142	73.2
Secondary UGRs	850	528	62.1	282	53.4

**Table 2.3** shows that only 66 per cent and 62 per cent of the required number of flow meters were present/available at primary and secondary UGRs/BPS, out of which only 73 per cent and 53 per cent respectively, were functional. Thus, data on water inflow and outflow were incomplete to the extent of the shortfall.



Further, flowmeters found installed but dysfunctional during the joint field visit of Jal Vihar (old) BPS on 1 June 2022 and Janakpuri A2 BPS and Janakpuri B2 BPS on 16 November 2022, are as shown in **Photos 2.3** and **2.4**.

#### **2.4.1.2 Flow Meters at Water Emergencies<sup>6</sup>**

The status of installation and functioning of flow meters at water emergency points as on 31 March 2022 is given in **Table 2.4**.

<sup>5</sup> ACE(M)-1, ACE(M)-3, ACE(M)-4, ACE(M)-5, ACE(M)-6, ACE(M)-7, ACE(M)-8, ACE(M)-9, ACE(M)-10 have provided a common reply for the entire duration 2017-18 to 2021-22 or have provided single data for the latest year 2021-22. Hence data analysis has been done for that data; ACE(M)-2, ACE(M)-11 have provided year-wise data and for them, the latest data pertaining to 2021-22 have been taken for data analysis

<sup>6</sup> Water emergencies are the designated locations from which DJB supply water through tankers.

**Table 2.4: Status of flow meters at Water emergencies (as on 31 March 2022)**

No. of Water Emergencies (W.E.)	Total filling/hydrants points at W.E.s	No. of Flow meters present / installed at filling-hydrant points	No. of Flow meters functional
30	161	47	14

Source: Data provided by DJB

As is evident from **Table 2.4**, only 29 *per cent* of the 161 filling points had water meters installed as of 31 March 2022, of which only 30 *per cent* were functional.

Thus, DJB was not in a position to accurately measure the water supplied through different water emergencies, despite the probability of wastage and pilferage of water from them being high.

### 2.4.1.3 Deficiency of Flow Meters at Borewells

As per the Economic Survey report of Delhi for the year 2022-23, DJB had 4,919 tube wells in various parts of Delhi and there are 11 Ranney wells along river Yamuna from which water is extracted and supplied to the residents of Delhi.

The status of year-wise flow meters installed and functioning at borewells as per *limited data*<sup>7</sup> provided by DJB is given in **Table 2.5**.

**Table 2.5: Status of flow meters installed and functioning at borewells**

As on 31 <sup>st</sup> March of the year	No. of borewells which are used for drinking purpose	Flow meters installed/functional at borewells	
		Number	Percentage
2017	840	130/128	15.5/98.5
2018	869	126/124	14.5/98.4
2019	906	124/93	13.7/75.0
2020	937	128/88	13.7/68.8
2021	1019	130/90	12.8/69.2
2022	1038	117/113	11.3/96.6

Source: Information provided by DJB

As is evident from **Table 2.5**, the percentage of the installed flow meters with respect to total borewells in any given year decreased from 15 *per cent* (2017-18) to 11 *per cent* (2021-22). There was a decrease in the absolute number of flow meters installed by 10 *per cent* during the period under review, while the number of borewells increased by 23.5 *per cent* during the same period.

In the absence of the flow meters at each borewell, the exact quantity of water extracted for supply could not be ascertained and the quantity of water supplied from the borewells could not be verified in audit.

During the Exit Conference, DJB accepted the audit finding and intimated that the required flowmeters have been installed and defective flowmeters repaired/replaced.

<sup>7</sup> Of around 1000 borewells.

## 2.4.2 Faulty flow meters

As per Section 12.2.5 of Manual of O&M of Water Supply Systems issued by CPHEEO, M/o Urban Development, GoI, periodic calibration and maintenance of the flow meter is necessary to ensure accuracy in recordings.

Test check of log sheets (March 2022) maintained at WTP Haiderpur (HP-I & II) revealed that both calculation methods viz. (i) flow-meter and (ii) rated capacity of the pumps, were being used for measurement of potable water produced at HP-I and HP-II. However, the flow meters were not calibrated even once during the years 2017-18 to 2021-22 rendering the data provided by them unreliable as can be seen from the log sheet data for flow-meters detailed in **Table 2.6**.

**Table 2.6: Details of pumping and production of water in March 2022**

(Quantity in MGD as per flowmeters)

Plant	Total raw water intake	Total clear water	Water Loss
HP-I	3700.55	3465.60	234.95 (6%)
HP-II	3696.77	3786.90	(+) 90.13 (2% excess)
<b>Total</b>	<b>7397.00</b>	<b>7252.50</b>	

Source: Information provided by DJB

It can be seen from **Table 2.6** that the HP-II water treatment plant treated two *per cent* in excess of the water intake which makes the data suspect. To ensure accuracy of data, flow meters require to be calibrated regularly. Since flow meters were not calibrated even once during 2017-22, DJB was not in a position to accurately assess the quantity of water treated and supplied by these WTPs.

In the absence of accurate information regarding raw water intake and potable water produced through the flow meters, Audit could not derive assurance that the WTPs at Haiderpur were working efficiently and the wastage of water during purification process was within the permissible limits of eight to ten *per cent*.

In the reply given by the Executive Engineer, water loss was 1.95 *per cent* in the month of March 2022. However, the data is not reliable as calibration of flow meter was not done by DJB.

During Exit Conference, DJB stated that all the flow meters had been calibrated, however, no supporting documents were provided to substantiate their statement. The matter was referred to the Government in July 2023, reply was awaited (April 2025).

***Recommendation 4: Government should install flow meters at inlet/outlet points of all WTPs, UGRs and Tubewells and ensure their regular calibration for accurate measurement of water flows.***

## **2.5 Operation and Maintenance issues at WTPs**

### **2.5.1 Absence of O& M Plan at WTPS**

According to para 2.4.2 of the O&M Manual of CPHEEO, a comprehensive Operation and Maintenance Plan is to be prepared to cover all the facilities and clear responsibilities were required to be fixed for the deployed officials.

Test check of records of WTPs HP-I and HP-II revealed that O&M Plan was not prepared at all. It was also seen that supervisory staff was neither assigned duties regarding operation and maintenance nor were checklists prepared for this purpose. In WTP Sonia Vihar, the O&M work was assigned to a private operator since its commissioning. There were no records pertaining to O & M activities at the test-checked WTPs.

In the absence of inspection and maintenance registers, regular and timely maintenance of the machines and inspections conducted by the supervisory officers could not be ascertained.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

### **2.5.2 Water quality testing**

Water Treatment Plant operations require laboratories at these Plants to perform round-the-clock basic process control testing at multiple sites within their facilities to examine and evaluate the suitability of water to be supplied to the public. National Environmental Engineering Research Institute (NEERI) had been contracted for technical guidance and support by DJB and it had made certain recommendations (December 2018) regarding the strengthening of water testing labs. Observations relating to water testing and related issues are as below:

#### **2.5.2.1 Manpower and equipment shortages at Labs**

For smooth functioning, the plant laboratory should have sufficient personnel to maintain round-the-clock monitoring of the treatment process. NEERI pointed out shortage of water testing personnel in the plant labs. NEERI had also mentioned 24 major equipment as required in a water treatment plant laboratory.

- At the four WTPs selected for detailed audit viz Haiderpur (HP) I & II, Sonia Vihar and Dwarka, operation and maintenance work of HP-I and HP-II plants was being done by DJB. Availability of operational staff at privately managed WTPs was adequate. The status of water testing personnel in the plant labs of HP-1 and HP-II (April 2023) is detailed in **Table 2.7.**

**Table 2.7: Status of water testing personnel in the Plant Labs  
HP-1 and HP-II**

Name of Post	HP-I			HP-II		
	SS	PiP	Shortage	SS	PiP	Shortage
ACWA	01	01	-	01	01	-
Chemist	01	01	-	01	01	-
Asst. Chemist	07	03	04	08	04	04
Lab Technicians	01	01	-	02	-	02
Lab attendant	08	06	02	08	05	03
<b>Total</b>	<b>18</b>	<b>12</b>	<b>06</b>	<b>20</b>	<b>11</b>	<b>09</b>

Source: Information provided by DJB

It can be seen from **Table 2.7** that despite the issues raised by NEERI, there was a 33 *per cent* to 45 *per cent* shortage of technical staff at WTPs laboratories.

- Audit further observed (March 2023) that, both Plant Labs HP-I and II were short of 16 and 18 pieces of equipment, respectively, against the required 24 equipment. Details are in **Annexure 2.1**.

### 2.5.2.2 Non adherence to BIS Norms

As per information on Delhi Jal Board website related to quality control, drinking water supplied from all available sources is tested regularly for ensuring potability as per BIS drinking water specifications 10500:2012 which provides that drinking water specification shall comply with norms for 43 test parameters. Against this, DJB was testing only 12 parameters<sup>8</sup> during water treatment process. Thus, DJB was not ensuring that the quality of water supplied was as per BIS norms.

### 2.5.2.3 Lapses at private testing labs

There was no DJB water testing lab at WTP Sonia Vihar and WTP Dwarka. Tests were being done by outsourced private agencies responsible for the treatment of raw water at WTP Sonia Vihar and WTP Dwarka.

Details of tests to be carried out as prescribed by DJB and tests being carried out by private agencies at WTP Sonia Vihar and WTP Dwarka are given in **Annexure 2.2**. Audit noted that most of the prescribed tests were not being carried out, resulting in shortfall up to 69 *per cent* in Dwarka WTP and 62 *per cent* in Sonia Vihar WTP in testing of required parameters at all stages of the water treatment process.

### 2.5.2.4 Mixing of treated and untreated water

During test check of records and information furnished by the DJB projects division and laboratories, it was found that 80 MGD to 90 MGD raw water from

<sup>8</sup> i) Colour, Hazen units, Max ii) Odour iii) pH value iv) Turbidity, NTU, v) Ammonia vi) Chloride vii) Iron viii) Nitrate ix) Total alkalinity x) Total hardness xi) residual chlorine xii) chlorine.

borewells/ranney wells was supplied to UGRs/consumers directly without treatment by DJB during 2017-18 to 2021-22, thus compromising water quality which could be hazardous to the health of the people.

### 2.5.2.5 Use of polyelectrolytes in recycling plant

DJB issued a memorandum in May 2016, banning the use of polyelectrolytes in water treatment processes in all WTPs and recycling plants<sup>9</sup> due to their carcinogenic properties.

Audit observed that the private operator of recycling plant at Haiderpur WTPs was using polyelectrolytes in the treatment process since 2017-18 despite it being prohibited by the Testing and Quality Control Department of DJB.

Director (T&QC), DJB accepted the fact that the use of polyelectrolytes was occurring only in private-run WTPs rather than DJB-run WTPs.

Audit is of the view that it is the responsibility of DJB to ensure that rules and regulations relating to water treatment are adhered by all WTPs, whether run by DJB or private operator.

During the Exit Conference, DJB admitted shortage of permanent staff and assured to provide sufficient equipment in the laboratories. While admitting the fact of mixing borewell/tubewell water directly in the primary UGRs without treatment, it was stated that the quantity was nominal and did not affect the quality of the treated water.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

### 2.5.3 Regular cleaning of reservoirs/UGRs not done

As per O&M Manual of CPHEEO (January 2005), Overhead Tanks (OHTs)/Reservoirs are to be cleaned at regular intervals (at least once in a year) and samples of water and silt/mud accumulated in the tank are to be collected for biological analysis. During audit of the selected WTPs HP I & II at Haiderpur, Sonia Vihar and Dwarka, it was noticed that only one out of 10 UGRs was cleaned at Haiderpur WTP between April 2017 and March 2022. Further, DJB performs flushing/cleaning of Pr. UGRs and Secondary UGRs on a yearly basis. Testing of water is done to ensure that, after flushing, the water supplied is of the desired quality. Analysis of limited test reports<sup>10</sup> provided to Audit revealed that out of 46 parameters as prescribed by IS 10500:2012 standards, only 16 parameters were checked by DJB (**Annexure 2.3**).

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

---

<sup>9</sup> To process wastewater from existing WTPs to extract treatable water which is further treated and supplied to consumer.

<sup>10</sup> Of 15 cases in respect of 13 UGRs.

***Recommendation 5: Government should ensure that water quality testing is performed for all the prescribed parameters.***

## **2.6 Augmentation of water resources**

Keeping in view the water scarcity in Delhi, DJB took initiatives to raise groundwater aquifers by adopting alternate means of surface water consumption like rainwater harvesting and issued various guidelines and regulations from time to time. Deficiencies noted in the implementation of these measures are as below:

### **2.6.1 Groundwater Management and Regulation**

For monitoring of district wise ground water level and assessment of quantity of extraction and recharge of groundwater in Delhi, the DJB is dependent on the Central Ground Water Board (CGWB).

DJB had extracted 90 MGD of raw water from 11 Ranney wells and 4919 tube wells during 2022-23. Additionally, permission for new tubewell/borewells is being obtained from Advisory Committee constituted in this regard by the GNCTD for augmenting the water supply.

#### **2.6.1.1 Non Enactment of Delhi Water Board (Amendment) Bill, 2011**

Delhi Water Board (Amendment) Bill, 2011 was prepared (January 2011) by DJB for enactment by the Legislative Assembly of the NCT of Delhi. The proposed amendment was meant to provide ‘*Planning for regulation, control and development*’ of groundwater as one of the functions of the Board, instead of only ‘*extraction and management*’ as under the Delhi Water Board Act, 1998. Audit observed that the amendment bill was yet to be enacted despite a lapse of more than fourteen years since the amendment bill was prepared by the DJB. Hence, there was no authority under the Delhi Government or DJB which has powers to effectively plan to regulate, control and develop groundwater resources.

#### **2.6.1.2 Quality of Ground water in Delhi**

Quality control cell of the DJB regularly monitors the groundwater quality to ensure that it is fit for drinking. Quality testing of groundwater was carried out on 16,234 samples by the eight zonal laboratories of the Delhi Jal Board during the period 2017-18 to 2021-22. Out of the total samples tested, 8,933 samples (55 *per cent*) were found unfit for potable purposes. Audit noticed that the percentage of failed water samples ranged from 49 *per cent* to 63 *per cent* during the audit period. Supplying groundwater from areas where samples were found unfit poses serious health risks to the public consuming this sub-standard drinking water.

## 2.6.2 Rain Water Harvesting System

Keeping in view the water scarcity in Delhi and the depleting groundwater levels, Delhi Jal Board (DJB) promoted rainwater harvesting. DJB issued various guidelines and regulations from time to time to support these measures.

Audit noticed the following shortcomings in implementation of Rain Water Harvesting System (RWHS) in Delhi.

### 2.6.2.1 Installation of RWHS

As per provision of Delhi Water & Sewer (Tariff and Metering) Regulations, 2012 (consumers having a plot/property of size 500 sq. metre or more are required to make provisions for rainwater harvesting within one year in case of commercial property and within three years in case of residential property. Failure to do so within this period entails enhancement of water bill by 50 *per cent*. While granting water supply connections, consumers are required to pay Infrastructure Development Charges to DJB based on the area of the property and thus, DJB should be having the details of consumers having properties with area in excess of 500 square metres.

As per information provided by RWH division of DJB, total 2909 RWHS were installed during 2017-18 to 2021-22 in plots of more than 500 square meter and 7590 RWHS were installed in various government departments till date. DJB divisions had conducted inspection of RWHS during the period from September 2021 to February 2022 and found 44 private properties in which RWHS was installed but not functional.

However, the details of properties with an area of 500 sq mtrs or the penalty imposed by way of enhanced water bills in cases of non-installation of RWHS were not provided to Audit. Thus, Audit could not ascertain whether DJB is levying water charges at enhanced rates in case of defaulters.

The matter was referred to the Government in July 2023, reply was awaited (April 2025).

### 2.6.3 Rejuvenation of water bodies/water sources

The Majority of existing water bodies/water sources in Delhi - underground water, lakes, rivers and reservoirs etc have to rely on monsoon rain to replenish naturally. Water bodies in NCT of Delhi are under ownership of various agencies such as DDA, ASI, MCD etc. NGT had directed the Government of NCT of Delhi (June 2016), Central Ground Water Authority and Delhi Jal Board to clean, maintain and restore all water bodies, natural wells etc. which are in existence in the NCT of Delhi. Subsequently, Delhi Jal Board had identified 240 water bodies for restoration and proposals to revive 155 water bodies at a cost of ₹ 376.79 crore were approved by DJB in December 2018. The consultancy work for preparation of DPRs was awarded to NEERI. However, DJB had awarded the work of rejuvenation of only 56 water bodies in nine phases from

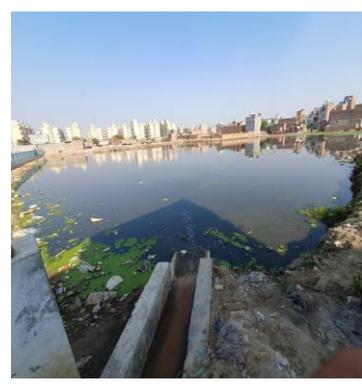
October 2019 to March 2022. The following are the observations related to these works of rejuvenation:

- i. There were excessive delays in the rejuvenation work as 24 out of 56 water bodies (43 *per cent*) were rejuvenated with delay of 14 months to 27 months against given time of three to six months. Further, no study on impact of rejuvenation works on the groundwater levels was carried out by DJB.
- ii. DJB did not make any agreement with the land owning agencies where the water bodies were located, for taking over and carrying out maintenance work after the completion of the rejuvenation of water bodies. Thus, continued maintenance of these bodies remains doubtful.
- iii. 776 water samples were collected from 38 water bodies by the DJB’s laboratories from March 2022 to November 2022. Out of these, only 172 samples (21 *per cent*) of 13 water bodies were found fit for recharging of ground water. Thus, DJB is recharging groundwater using contaminated water, thereby compromising groundwater quality and undermining the objective of rejuvenating water bodies.
- iv. Joint physical verification (November/December 2022) of three water-bodies where Phytorid technology<sup>11</sup> was being used (at Hastal, Siraspur and Toda Pur) and three water-bodies (at Sanjay Van, Burari and Rani Khera) where Floating Rafter technology<sup>12</sup> was being used, revealed the following:
  - The Phytorid technology was dysfunctional at Toda Pur site as the water body was completely dry. At Rani Khera, floating rafts did not have plants and other equipment (like air blowers and pipes) at the site.
  - At Hastal and Siraspur (Photo 2.5), no boundary wall was constructed, hence locals were dumping garbage in the water body. Both water bodies were found with lot of floating garbage. The water looked dirty. Thus, treatment done and expenditure incurred would become wasteful unless such dumping of garbage is prevented.

---

<sup>11</sup> Phytorid Technology uses specially selected plants in a constructed wetland system to filter and purify wastewater.

<sup>12</sup> Artificial floating platforms where plants are grown allowing them to filter pollutants from water through their roots.

		
<p><b>Photo 2.5:</b> Siraspur: Water body without boundary wall (09.12.2022)</p>	<p><b>Photo 2.6 &amp; 2.7:</b> Dry water body and empty Phytorid tank at Todapur (08.12.2022)</p>	

Water Testing Reports of these water bodies were not made available to audit.

The Division in its reply (December 2022) stated that the work of water body rejuvenation was carried out on the basis of DPR. DJB further stated that since it is not the land-owning agency, the point of lack of boundary walls around water bodies pertains to land-owning agencies.

The reply is dilatory. Since the onus of rejuvenating the water bodies had been taken up by DJB, they should have ensured the continued viability of the rejuvenated body and made comprehensive DPRs to ensure the sustainability of the rejuvenated water body.

The matter was referred to the Government in July 2023, reply was awaited (April 2025). During the Exit Conference, DJB had assured to comply with the shortcomings pointed out by Audit.